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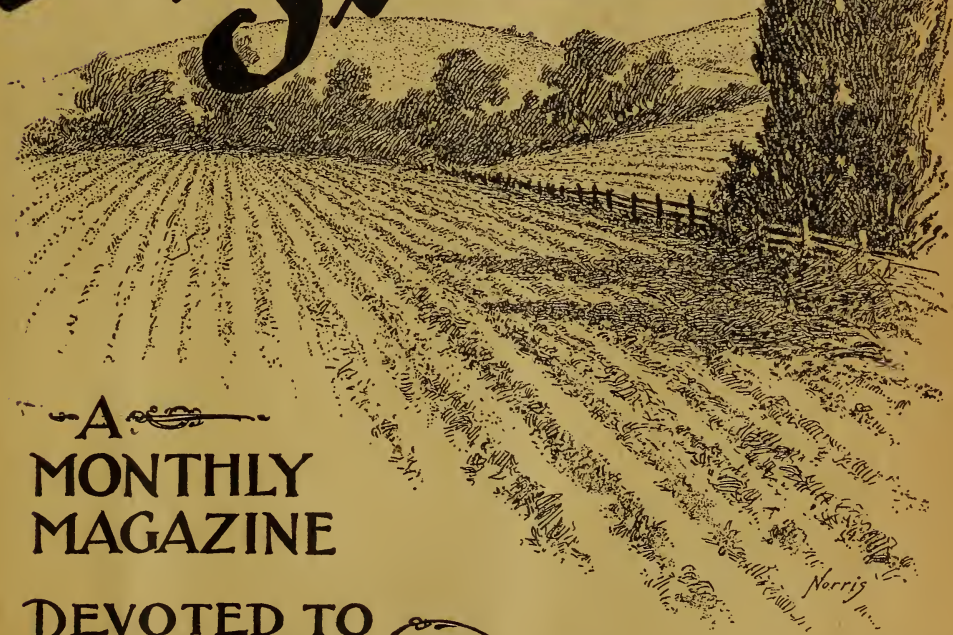
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Vol. XIV.

NOVEMBER, 1907.

U. S. Department of Agriculture
No. 2

The Agricultural Student



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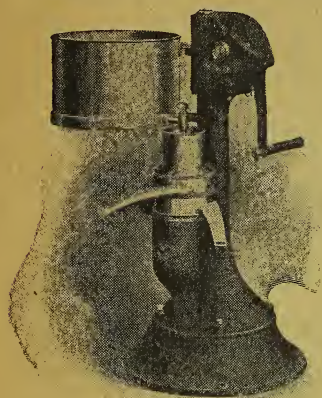
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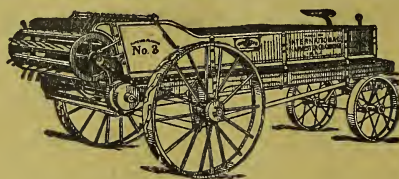
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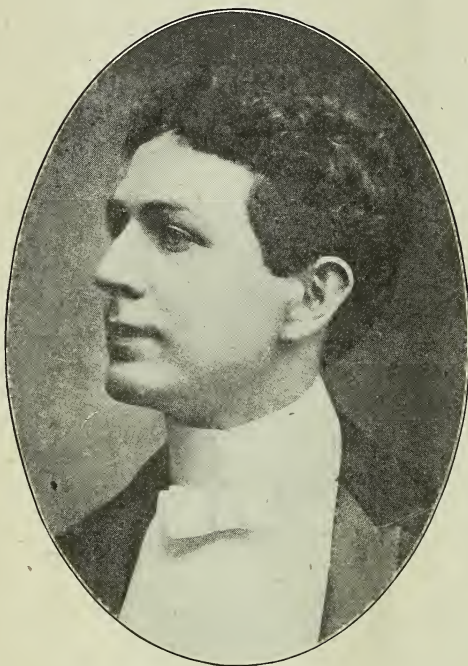
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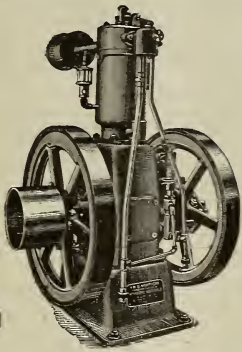
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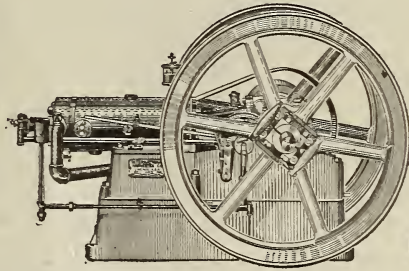


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Professor Lazenby's Home Before Ornamental Planting Was Done.

THE AGRICULTURAL STUDENT.

VOL. XIV. OHIO STATE UNIVERSITY, COLUMBUS, NOVEMBER, 1907 No. 2

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EDITORIAL.

A most interesting line of work in an educational and social way just recently came under the notice of the editor. This work has been going on for two years past, and was started by an ex-student of O. S. U. Agricultural College, Mr. Homer B. Crall, who was here 1902-'04. Mr. Crall organized the Bucyrus Y. M. C. A. Agricultural Club, with the idea of providing a society where the young men of the community could meet and while enjoying social intercourse, could study agriculture in its more advanced phases. This club has proven very popular and this year a series of lectures by instructors from O. S. U. and experiment station men has been planned, and a regular course of study has been laid down.

It seems to the editor that Mr. Crall is doing something for his community no man going out from our school would which will prove worth while and surely make a mistake by doing something along the same line, to better the social and educational life in his community.

INDUSTRIAL EDUCATION

By R. L. Shields.

Assistant in Agricultural Extension Department.

The wealth of the natural resources of America has been so long proverbial that we have almost considered it inexhaustible. The time is here when these resources must be rigorously protected. We need to recall but a few years to be impressed with the waste and often prodigal use of this wealth. Our coal fields, gas supply, etc., were thought to be unfailing; the great forests—not many years ago impenetrable—are fast disappearing, and the soil has been drawn upon from year to year until we confront the time when conservation of resources is essential. In asserting this I have given due consideration to the great strides toward improved methods and stricter economy in the industrial world, but are we acquiring this practical knowledge fast enough?

We realize now more than ever the importance of higher education for all vocations. Responsibilities in every line of occupation were never so great, and it is only reasonable to conclude that they shall continue to increase with time. Daily routine work alone is insufficient; it must be accompanied by trained thought to come up to present requirements. In short, higher education in industrial lines is demanded.

It is not sufficient to take up industrial education after completing the course offered in the public schools. There must be a definite preparation on the part of the youth whereby the foundation of a practical education is introduced at the most impressionable age, and respect for and interest in the environment of the child are a natural result.

With all due respect to our general educational system, it seems that a vul-

nerable point of attack can be found in its failure to give proper recognition to the industrial side of education. The present public school system has too long ignored industrial training. The president of an industrial school in commenting upon our educational system said: "Public education should touch practical life in a larger number of points; it should better fit all for that sphere of life in which they are destined to find their highest happiness and well being. It is not meant by this that our education should be lowered mentally, but that it should be based, if possible, upon those elements which may serve the double purpose of a mental culture and discipline and development of the capacity of the individual with and through the acquisition of artistic tastes and manual skill in the graphic and mechanic arts which most largely apply in our industries."

Our educational system is so constructed that it better serves for the preparation for professional life than for industrial life. Those who become doctors, lawyers, ministers, teachers, etc., find in it a marked advantage compared with the many who choose some industrial pursuit. To realize the truthfulness of this we need but to reflect upon our general curriculum, which, as a whole, is chiefly for mental discipline.

In discussing industrial education, agriculture, of course, is included, and it is this in particular that I desire to emphasize. Granting that an educational system lacking industrial training is inadequate for those who are to follow such pursuits, we can better realize the situation by a concrete example in our own

state. From the 1900 census, we learn that those following the professions number only 77,000, and this includes school teachers, who make up one-third of that number, while those engaged in agricultural pursuits alone number 414,000. Isn't a revision of our curriculum justifiable whereby industrial education could be incidentally introduced early in the child's school life and this phase gradually developed along with the literary side? The education of the mind and the education of the hand need not be antagonistic. An eminent Shakspearian critic has justly said: "It is *desirable* that children should learn to think, but it is *indispensable* that they should learn to work; and I believe it is possible for a large, perhaps a larger, portion of them to be so educated as to find pleasure in both. But the great question is—*how to render the desirable thing and the indispensable thing mutually helpful and supplementary.*"

The State of Ohio, in a degree, has committed itself to industrial education. There are over 4500 persons in her penal institutions, not to mention one thousand who are cared for at the Ohio Soldiers and Sailors Orphans' Home. In the penal institutions they are required by the state to work at hand labor, while the children at the home just mentioned are given an industrial education. At Lancaster boys are taught trades and taught to till the soil and cultivate plants under the instruction and direction of a teacher; at the Industrial home for Girls, at Delaware, they are taught to sew, cook and other essentials for housekeeping; at Mansfield the same things are taught as at Lancaster, with a greater degree of emphasis on agricultural work. All of

these are unfortunates in one sense, of course, but, on the other hand, who are the unfortunates—the ones who are prepared for their life-work or the ones who simply get the daily routine work?

Some doubt the feasibility of industrial training in the rural schools, believing that it necessarily replaces some of the branches of long standing. This is a wrong conclusion, for it is *adjustment* and not *substitution* that is advocated.

There is a great opportunity here for the teacher who has a knowledge of nature-study and the fundamental principles of agriculture, and is in thorough sympathy with this nature-environment. Nature-study can be incidentally taken up early in the child's life, and with the school garden, the cultivated fields, and woodlands near by, a love for country life can be created at an early age. As the child becomes more advanced, arithmetic, physical geography, physics, botany and zoology all can be so taught as to give practical application to agriculture.

Through such process of education the child becomes more mindful of the wastefulness of our resources and, at the same time, more considerate of the conservation of them through the natural laws with which he has become acquainted.

We do not mean to be mindful of the practical side of education alone—a love for literature needs to be cultivated as well. Without the spiritual attitude of the child an education in any line amounts to little.

Create an interest in nature-environment. Educate for a skilled hand as well as a strong mind. With such a balance we can truly "see books in running brooks, sermons in stones, and good in everything."



Prof. Lazenby's Home at Present Time Showing Planting Around the House.

THE EXTERNAL ADORNMENTS OF A HOME

By Professor W. R. Lazenby.

Professor of Horticultural and Forestry at O. S. U.

In the laying out and planting of our home grounds, two points were kept in view. First, it seemed desirable to produce a good effect from the street, and second, we coveted a comfortable outdoor privacy for the family. On large grounds it is an easy matter to attain both these ends. But we had to begin with, a naked town lot of only 75 feet frontage, and 160 feet in depth, and this made the question a somewhat difficult one to solve. We might have adopted the English style, and secured complete privacy, by building a wall, or having a thick, high hedge along the front. This was not to our taste. As members of the community and a unit in the neighborhood, we had no desire to be exclusive, and with all our private and personal

ideas, were willing to conform in a general way, to the style and character of the street on which we lived. The aim and end of city home planting, should be a balance between individualism, and socialism.

As can be seen in the illustration on page 6, the house is located on one side of the lot, and the planting in front, and immediately about the house, is done in such a way as to give a frame work, or setting to the building. An attempt was made, not only to preserve but emphasize any artistic points, that both the front and side view of the house might present, so as to give a pleasing effect from the street. In the same way, the side lawn offered an opportunity to introduce a large variety of ornamental plants,

many of which may be seen from the street, as well as from the house and lawn itself.

As we like to use a good part of our home grounds as a sort of a summer living room, the rear portion of the side lawn as well as that back of the house is embowered and belted in with shrubs and trees. This shields us from the passers-by on both street and alley, and gives us space to plant a large variety of trees, shrubs and flowers. In this planting we have put into practice some of the fundamental principles that govern the art of landscape gardening, and have made a picture, or produced a landscape effect. This has been done by so massing the trees and shrubs, as to show some idea of construction or purpose. In other words, we have tried to observe the principles of unity, variety, and harmony, without which no satisfactory result can be realized from any art of taste or design. Many grounds are planted with numerous trees and shrubs, each having merit as an individual, but so arranged that each stands unrelated and

disconnected from the grounds as a whole. Such planting may have value as a collection, but is meaningless so far as any artistic or picture-like effect is concerned. Our plan of planting makes a landscape or picture, giving effectiveness to both house and lawn. The materials used are for the most part simple and inexpensive,—June grass for the greensward or groundwork, and native trees, shrubs and vines, for the framework.

The whole center or interior of the grounds is devoted to an open lawn. This gives a fairly large area covered with nature's green carpet. As it is practically free of trees, shrubs and flower beds it can be easily cared for. An average of two hours of active labor a week throughout the growing season keeps the lawn well clipped, weeded, and the small terrace area sprinkled. Excepting the terrace, and a narrow strip of turf between the street walk and the curb, no sprinkling is ever done. To obviate this, when moisture is needed to keep the grass in good condition, the



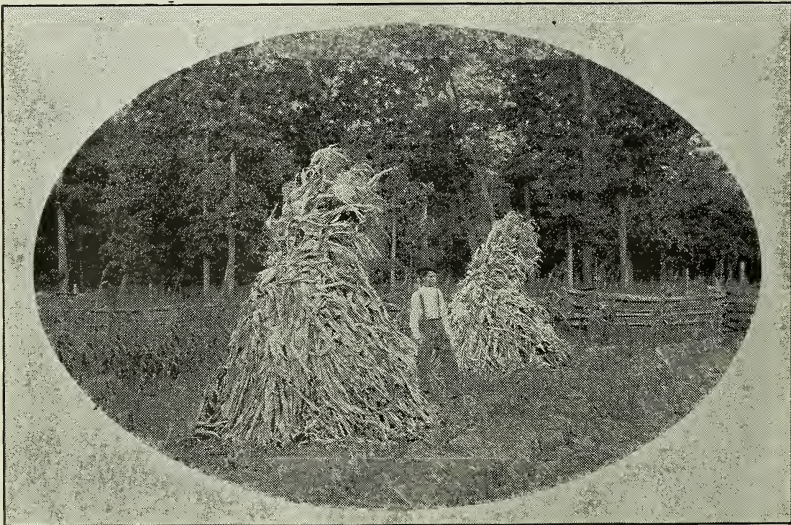
The Effect Produced by Massing Shrubbery and Ornamental Trees.

water is applied in the form of sub-irrigation, or under-surface watering. Lines of three-inch tile eight feet apart are laid, the whole length of the lawn, at the depth of from six to eight inches. These tile have a slight fall from the front to the rear of the lawn, at which point, there is a good outlet. In early spring, or at any other time when there happens to be too much moisture, the outlet of the tiles is open, and they act as an efficient drain. When there is a lack of moisture the outlet is closed, and water is run into the tiles by means of a hose. This water escapes through the joints or spaces between the ends of the tile, and thoroughly moistens the ground. Wherever there is a compact clay sub-soil and a reasonably level surface, this is a cheap and satisfactory way of watering a lawn. I have tested this plan for the past six years, and the only change

I would suggest is to place the rows of tile nearer together. In almost any soil six feet would be better than eight, and in a stiff heavy clay, four feet apart would be better than six.

Among the trees now growing on our home grounds are one or more species or varieties each of the following: Ailanthus, ash, box elder, buckeye, catalpa, coffee, elm, ginkgo, linden, maple, mulberry, poplar, cercis, sycamore and willow. In addition to these there is a sprinkling of evergreens.

The principle shrubs are barberry, bladder-nut, burning bush, dogwood, elder, flowering currant, honeysuckle, Japan quince, lilac, pavia, pivot, snowball spice-bush, spiræa, and syringa. Among the climbers are found bitter-sweet, clematis, moonseed, roses, sweet honeysuckle, trumpet creeper and wistaria.



Harvest Time.

NOTES ON THE VALUE AND CARE OF SHEEP

By Ralph A. Postle.

It is surprising to know how few farmers really know anything about sheep. The average farmer recognizes that there is a class of domestic animals called sheep and knows sheep when he sees them, but this is about as far as it goes. He knows very little of their place and value on the farm and still less of their care.

It is clear to most people why horses, cattle, or swine are kept on a farm, but not so clear why sheep should have a place, too. To my mind there are few farms that would not be benefited if sheep were kept on them. In the first place sheep should be kept for the same reason that other stock are kept, that is primarily financial returns. A few sheep on the average farm will pay as large a per cent. on the capital invested as any other class of live stock. To make them pay, however, they must be properly handled. Sheep do not require a great amount of feed and therefore the actual cost of keep is not very much. A sheep yields a double profit. First, a ewe produces a lamb which easily pays for her keep. A ewe often raises two lambs which at ordinary butcher prices in the fall will bring \$7. This is a very fair estimate. The other source of income is the wool. An average fleece of wool weighs about six pounds. With wool worth about 30 cents a pound an ordinary fleece will bring about \$1.75. Therefore a ewe will earn from \$2 to \$5 per year. I know of one case of a pure Shropshire ewe that raised two pairs of twins in as many years. Three of the lambs were sold for \$65, and the other lamb that is left is easily worth the cost of the ewe. The wool from the ewe paid

for her keep, so the net income from this ewe is \$65 in two years. I have said that a ewe yields a double income, and I may say that a good ram often pays better. This surely shows that sheep are profitable.

Another argument why sheep should be kept on a farm lies in the fact that they help to keep weeds in check. Sheep are fond of many young, tender weeds. They eat them from choice, not because they are compelled to from want of food. For instance, I know of three meadows this year, two of which were pastured by sheep until about the middle of June. As a result the pastured meadows were actually benefited. When the sheep were taken out scarcely a weed could be seen and only a few small ones came on later. The meadow which was not pastured showed plenty of white top and other common meadow weeds. The pastured meadows were not hurt, for you could not see where the sheep had been. These meadows were 25 and 30 acres in size. The number of sheep was 19 ewes and 22 lambs, or practically an acre and a half to the sheep ridged of weeds. It is also a rare thing to find much of a growth of rag-weeds in the sheep pasture, especially if the sheep were put in early, while the weeds were young.

Let us suppose a man wants to get a start in the sheep business. The best thing he can do is to decide whether he is going to get coarse wools, middle wools or fine wools. I think he would do best to select some high-grade middle wool sheep; some of the Down breeds especially. This is because the sheep will have to look after themselves during the first two or three years, and under

these conditions they will do better than would either the coarse or fine wools. In selecting ewes for breeding get high-grade, strong, rugged ewes with good fleeces. It is a good plan to get these ewes as nearly uniform in type as possible. It makes no difference how good or how poor your ewes are *always* use a pure-bred ram. Your lambs will be more uniform in type, make better mutton, and shear heavier fleeces of higher-grade wool, than if you used a common ram of non-descript breeding.

The breeding season generally runs from September 1 to about December 15. Probably the average man will be more successful if he has the lambs come from the middle of March to the middle of April. This brings the lambs at a time when grass is soon available and they are more easily taken care of.

In the late fall keep the sheep out of the cold rain for they do not dry off quickly and are apt to take cold. By all means shelter your sheep during severe winter tweaher and feed them well, for at this period of the year the ewe must support her lamb and also put on flesh, so that she will be in good condition for taking care of her lamb when it comes.

Lambing time furnishes a test of whether a man is a good shepherd or not, for it is at this season that sheep require the closest attention. The ewes must be kept in a dry, warm place and watched closely. If a ewe shows signs of giving birth she should be watched until after the lamb is born. Often a little help is of advantage both to the ewe and the lamb. As soon as the lamb is strong enough it will nurse and if it is too long about it help should be given it. A good plan is to put the ewe with a young lamb in a pen to herself for a few days until the lamb learns to take care of

itself. As soon as the lambs are old enough they should be taught to eat and fed as much as they want. A good way to do this is to fix a creep into a pen where there is a trough with plenty of fresh feed. If they are fed in this way the lambs grow better and get fatter besides making the work of the ewe easier. As soon as the weather will permit the flock should be shorn and put out on pasture. It is on pasture that the lambs get stomach worms and signs of these should be given close attention. If it is possible keep changing their pasture about every month and if you are a close observer you will notice a change nearly every time you do so.

In order to make much of a success at the sheep business you must know sheep and if you learn to know them by experience you cannot help but love them. Learn to know your sheep individually and have the sheep know you. Always be quiet around your sheep and keep them tame. Do not be afraid of doing too much for them and they will do well by you. There is something about sheep that appeals to you that you do not find in any other class of live stock. I cannot tell what it is, but it exists nevertheless. In closing I cannot do better than to quote a few notes from Mr. John Ray's talk here last winter:

1. Do not breed to a dry-fleeced ram.
2. The sire is the improver, but in order to be such he must be a good individual and descend from the best lineage.
3. Study sire, dam and blood lines.
4. If you are a Shropshire breeder breed to beat Mansel, of England.
5. Follow the show ring, but show only good, well-fitted sheep.
6. Have a right ideal and breed to produce it.
7. Honesty is of as much importance in sheep breeding as it is any where else.

ORCHARD COVER CROPS

By W. G. Yeager.

Technically considered, a cover crop is a crop grown during late summer for the protection of the ground during the winter or dormant season in plant life. The term, however, has a much broader significance when considered from the horticulturist's standpoint. The effect of cover crops can be traced by their influence in several directions, as follows: (1) Soil moisture, (2) freezing of the soil, (3) physical condition and (4) chemical condition of the soil.

Cover crops are grouped under two general classes, leguminous and non-leguminous.

The first by means of the bacteria on the roots, add nitrogen to the soil. The clovers, beans, peas, vetches, etc., belong here. Those of the second class add no nitrogen to the soil. All our grasses, rape, corn, buckwheat, etc., belong to this class.

The cover crop has much to do with the moisture content of the soil, varying to some extent with the nature of the cover crop and the conditions under which it grew. All cover crops remove moisture from the soil during the growing season; this becomes of great importance in the proper ripening of the wood in the young orchard. Cover crops at certain stages may tend very materially in the conserving of moisture, this being accomplished in several ways. The ripened crop may prevent evaporation. By far the greater amount of moisture is conserved through the aid of the humus, which the cover crop produces when plowed under. This same humus is a very important factor in the improvement of the physical condition of the soil; it prevents leaching in the light, sandy soils, prevents hardening in

the heavy, clay soils; it hastens the drying out in the spring, thus increasing the length of the cultivating period.

The improvement of the physical condition in soils is the first step in the improvement of exhausted soils; hence cover crops (and drainage) are the foundation for the betterment of soil conditions.

The cover crop improves the chemical condition by using as plant food for growth, certain nitrates, and other food elements that would have otherwise been lost by leaching.

If the cover crop is a leguminous one the supply of nitrogen has been very materially increased.

Much work has been done in studying the relation of cover crops to the freezing of the soil. The Ohio Station in an 18-year old orchard has clearly demonstrated the effect of cover crops in protection from frost. The one-half of this orchard was given clean cultivation during the early part of the summers, and followed by annual cover crops (crimson clover). The other one-half was given clean cultivation throughout the season.

In the latter the injury from cold was much greater than in the first half. Every winter showed severe effects of freezing; on some trees it was branches, both small and large, while on others it was the whole tree. In the spring the trees come out with a yellowish, sickly foliage, while that part protected by a cover crop showed little, if any, injuries from frost, and had a remarkably heavy, dark green foliage.

Mr. G. F. Warren, of Cornell, N. Y., on carefully examining the products of 1138 apple orchards, in the three leading apple producing counties of the

state, found an increase in production of from 10 to 25 per cent. from the orchards in which annual cover crops were being grown, in preference to either sod or clean cultivation.

On an investigation made by the Ohio Experiment Station in orchards of the Lake Erie peach belt, as to the probable cause of the severe winter killing of trees during the winter of 1903-04, it was found that in orchards of clean culture the injury was much greater than in the covered orchards. The trees in the open ground that were not killed outright, were very slow in starting, and all severely injured. Those in the covered ground suffered a much smaller loss, many not being injured in the least. At different times during the winter, notes and measurements were taken as to the depth of freezing in the open and covered soils.

In the open ground the soil was found frozen to a depth of eighteen inches, while in the covered soil it was frozen but eight inches deep.

In cover crops as in other crops, a rotation is advisable, so far as possible. The Nebraska Station in one of its publications has summoned up the requirements of a cover crop for that region. These requirements are so nearly identical with those of this region that I quote them as follows:

It should start growth promptly in order to insure an even stand and to choke out weeds.

"It should grow vigorously to insure a heavy winter cover and to dry the ground in case of late-growing trees so as to hasten their maturity.

"It should be killed by the early frosts so that it will stop drying the ground after danger of late tree growth is passed and help to conserve our light fall rains so much needed by the trees in winter. If we should not use a cover crop that

lives until late fall, there is even more reason why we should not tolerate a crop that lives over winter and that may not only keep the ground dry in late fall, but that begins drying it again early in the spring.

"A cover crop should be heavy enough to furnish as good direct protection as possible against freezing, and thawing of the ground, and it should stand sufficiently erect to hold snow against the power of the strong winds.

"If a cover crop can be found to satisfy the above conditions, it will prevent the washing away of the surface soil on all but the steepest slopes, and by the formation of humus in its decay, will improve both the physical and chemical condition of the soil.

"Finally, in the case of poor soils or of old and feeble trees the cover crop should be a leguminous one in order that it may add to the supply of nitrogen in the soil and thereby increase the vigor of growth of the trees."

I think that this last statement will apply very favorably to the majority of our eastern orchards. On some of our more improved soils where the less nitrogen exhausting fruits are being grown it is possible to have nitrogen in an excess to the extent of over-stimulating the growth of the trees, and resulting in injurious condition. Most any of our common field crops will answer the purpose of a cover crop.

The individual grower must make his own selection, after carefully considering the condition of his land, trees and locality. In sections where it will grow I think that we can safely put crimson clover at the head of the list. It is a legume and great nitrogen gatherer. In localities where it winter kills, it has never the less served its purpose.

Some enthusiasts are booming alfalfa as a cover crop, the accuracy of which

it will take time to prove, as it has with crimson clover and others.

The Illinois Experiment Station in 1901 started experiments in several orchards with different cover crops. The seed was sown late and the result not satisfactory. The following year the experiments were continued, the seed being sown earlier in the season. The results were very much more satisfactory. The rye made the best growth of all started. It started early in the spring and soon made a thick growth. The hairy vetch did very satisfactorily and was found to serve the purpose admirably if sown not later than August 1. Forty pounds were

sown per acre. It is a heavy grower and an excellent soiling crop. When we simply want a cover crop, rye is the cheapest and most satisfactory. It will grow under a wide range of conditions.

In fruiting orchards when a stimulating effect is desired, buckwheat is a very satisfactory crop.

The cover crop has undoubtedly taken a permanent place in the judicious management of the young fruit plantation, and can make available a good portion of the necessary plant food until the orchard begins to bear fruit, when the application of commercial fertilizers becomes a necessity.

CONTROLLING THE SAN JOSE SCALE

By Ed. Kinney.

Among the insect enemies none are harder to combat than the armored scales belonging to the family Coccidæ. Especially is this true of the San José Scale, or *Aspidiotus perniciosus*, the scientific name. In the October Student an article dealing with the appearance, habits and something of the life history of the San José Scale was published, and in this article it is desired to add to that discussion, some of the more practical ways of controlling this insect.

The appearance of the San José Scale in this country, and its spread in such an alarming manner, in so short a time, led to a careful search for some remedy for its control. This was not readily found, and for some years it seemed that nothing could be found which would be efficient and at the same time practicable in its application and moderate in cost. The nature of the scale is such that none of the known insecticides were of much value and something radically different from the then known remedies had to be

found. True, whale oil was an old remedy that was used with some degree of success, but its cost, and the difficulty of application made its use unsatisfactory; something had to be found that would penetrate the waxy scale covering of the insect and destroy the insect beneath. Experimenters had in mind two ways in which this might be done: by using an oil which would penetrate and destroy in the same manner as any body poison; and some substance of a caustic nature which would weaken the scaly covering and get the insect in this way. Many tests were made with oils of various kinds. Crude petroleum seemed to give the best results, but its use was fraught with danger to the fruit trees. Oils from certain fields seemed to have no injurious effects when applied at the proper time, and again oils from another district might kill all the trees that were treated. The varying character of these oils and an ignorance on the part of the fruit growers as to when to use them and

how to use them, made them a very doubtful remedy to apply.

While experiments were being carried on in the East to find some effective insecticide, Pacific coast growers were having good success with the lime sulphur wash. This was used as a sheep dip in the West and its value as an insecticide for scale control was accidentally discovered, just as the value of the Bordeaux mixture as a fungicide was accidentally discovered in France. Experiments were made with it in the East, but for some reason these first experiments did not show good results, and unfortunately the conclusion was jumped at that it was not effective in a humid climate. Later experiments made after testing almost everything else, showed it to be as effective in a humid region as in the dryer western states, and now it has come to be regarded as practically the only standard solution for the control of the San José scale. As soon as this was recognized various experiments were carried on to ascertain the best methods of using it, the proper strength, etc., and now we are able by its use to practically control the scale in our orchards. There has been nothing discovered which is as efficient, and at the same time as safe and economical to apply.

The wash, as first prepared consisted of lime, sulphur and salt. The addition of the salt was supposed to be necessary to make the wash stick to the trees longer. However recent experiments have shown that the salt adds little or nothing to the effectiveness and is an unnecessary expense. The formula as now given, therefore, omits the salt and only lime and sulphur are used. The directions for its preparation and use as given by the State Orchard and Nursery Inspection Department are as follows: Take 50 pounds of good stone lime and slake in about 25 or 30 gallons of water.

Heat to boiling and add slowly and with constant stirring 50 pounds of ground sulphur. Boil briskly for at least an hour, stirring frequently. Dilute with water to 150 gallons and apply at once."

The wash as thus prepared consists of chemical compounds of lime and sulphur of many kinds. The complete chemistry of these compounds has never been worked out, but it is safe to say that the sulphites predominate. On standing for any length of time chemical changes take place, which reduce the value of the mixture; therefore the necessity of applying at once. Just what changes take place is not known, but a recent U. S. bulletin on the subject advances the idea that free sulphur is given off, which in its nascent stage gives the wash its effectiveness after it is on the plant. The old idea that it must be applied while hot is erroneous, for no fine spray can hold much heat long after it leaves the nozzle. A few hours' standing will do little damage.

In boiling the mixture the beginner sometimes has trouble with its boiling over. The vessel should not be filled so full as not to leave any room for expansion, and if watched carefully for about fifteen minutes and a little cold water dashed into it when it threatens to come over, it will by that time have given off the gases which caused it to overflow, and will usually boil along in a steady way.

Before being put into the spray outfit it should be carefully strained or there will be an immense amount of trouble with nozzles clogging. It is also necessary to keep the mixture thoroughly agitated so that the heavier parts will not sink to the bottom and make the spray uneven.

As may be supposed this wash is very strong and would easily scorch the foliage; so it is applied when the trees are

in the dormant state. As soon in the autumn as the leaves have fallen is the best time for the first application; and in the spring before the buds swell, for the last application. If scale are quite plentiful two applications should be made. If very few the spring application may suffice. Extreme care should be taken to cover every part of the plant with the spray, for if only a small place is missed it may harbor sufficient scale to almost cover the tree again before the next growing season is over. Trees should be very carefully pruned and if scale are already bad, should be cut back severely. However, if trees are well taken care of, the scale will not be permitted to get very numerous.

It is not necessary here to give directions for spraying, as it is applied like any spray. However, good pressure insures the spray reaching all parts of the tree—cracks, crevices, etc.—and as in all spraying it will not pay to use a single nozzle on a line of hose, but two nozzles on a “Y.” Much better time can be made in this way.

When once the scale has gotten a foothold on the premises, it can scarcely be hoped to eradicate it. There will always be enough escape destruction to furnish a start for the next year. Therefore it is necessary to spray every winter if success can be expected.

For the man with but a few trees, it will perhaps not pay to prepare his own wash. The prepared lime-sulphur can be obtained in sealed cans and is just as good as the home-made, but of course more expensive. It is very easy to apply and by simply diluting to the proper strength it is all ready for use. At the present time there are various patented articles on the market which are claimed to be superior to the lime-sulphur wash. They are mostly oils from which the volatile portions have been removed, and

as the volatile oils are the ones causing plant injury they are thus said to be rendered safe to use. However, they have not been sufficiently tested to enable them to be recommended, and as yet they are very expensive. Future tests may demonstrate the value of these oils, and if they can be made cheap enough they will have the advantage of ease of application.

The writer has been frequently asked what to do in case the scale has gotten so numerous as to completely encrust the tree, and if such trees can be saved. If such trees exist in an orchard of any size and the other trees are not badly affected they had better be cut down, as they will prove a source of infection to the rest of the orchard. Again, even if only a few trees are owned and a neighbor has an orchard close by such trees should be destroyed at once. Also, if the trees are peach, they might as well be cut out, for they will not recover from a bad attack. Sometimes, however, if it is earnestly desired to save a tree and it is not a menace to other close by trees, it may be saved. Such conditions often exist in the cities, where scale is usually so bad that all trees are infested and leaving a tree could hardly render the situation worse. Or a valuable orchard may have become infested and the owner is willing to make strenuous efforts to save it. The first thing to do is to cut back very severely so that every part may be reached by the spray. Sometimes it is necessary to cut out half the tree. Before spraying the tree should be gone over and all the scale possible scraped off with a hoe or any other tool suitable for the purpose. Then the spray should be applied at least twice during the winter. When the season comes for the young to be born, the trees should be carefully watched, and if it appears that many of the old scale have escaped and the young

are showing up plentifully, it will be necessary to give a summer treatment. The young can be killed for a few days after being born by kerosene emulsion, and if this is applied frequently much good will be done. The writer, under the direction of the chief inspector of this state, made some experiments with dilute lime-sulphur wash as a summer spray, and found that a mixture could be prepared of such strength that very little damage was done to the foliage by its use, and it stayed on the tree longer and gave better results than the kerosene emulsion. The regular wash should be diluted four times for this spray and efforts be made to keep the spray chiefly on the branches. A few leaves will be scorched, but not enough to do much damage.

In the city and communities where scale is so prevalent efforts should be

made to plant those trees which are immune to scale attacks. The list of fruit trees of this character is very small, but since shrubs of many kinds are subject to its attacks they should also be considered in planting. The Kieffer pear, the sour cherry and the quince are almost immune from scale attacks and can be planted anywhere without fear of scale. Among the shrubs the most liable to attack are Japanese quince, lilac and various forms of flowering currants. Among shade trees or ornamental trees the mountain ash, Carolina poplar, elm and soft maple are very liable to scale attacks. These had better be omitted from the list in setting out ornamental plants.

The rapidity of the spread of San José scale, and the amount of injury it can do, is almost incredible to one who is unacquainted with its habits. Verily the small things of this world are sometimes of great importance.



"Thanksgiving is Coming."

Dairy Development in the Mahoning Valley.

M. D. MOORE.

The region of which I write is located near the head waters of the Mahoning river, and comprises a part of Columbiana, Stark and Mahoning counties.

The country is gently rolling, and naturally well adapted to dairy farming. It is abundantly watered by the Mahoning river and its numerous small tributaries, the winding valleys of which afford an abundance of fresh succulent pasture, so necessary for successful dairying. The soil is fertile and productive, producing good crops of corn, oats, wheat and clover grown in rotation.

The people are progressive and industrious. Their homes are kept neat and attractive. The rural telephone which is found in nearly every home, has become an article of great convenience and utility. This with rural free delivery, bringing the numerous farm journals, magazines and daily papers, keeps the farmers closely in touch with the world about them.

The farms vary considerably in size, but in most cases they are well kept and equipped with good comfortable buildings and the necessary tools and machinery for successful farming. Yet in general dairy equipment and sanitary conditions there is room for improvement. The most successful dairymen have made much of the needed improvement, and are securing very much better results than before. Their herds are composed of pure bred cows of the breed most suitable to their needs and fancies. Among the greater number of farmers, however, the herds are made up of grade cows of the various breeds. In many cases also they do not keep as many cows as they should, for the size of the farm, to secure the best results, or in other words they lack to a certain extent the

specialization necessary for successful dairying. Another mistake which many are making is in not keeping sufficiently accurate records of what each individual cow is doing. This, however, is rapidly being corrected and the unprofitable cows discarded from the herds.

The market conditions are also rapidly changing. A few years ago practically all of the milk produced was sold to the local creameries and cheese factories. But now the farm separator has come into use. The milk is separated on the farm, the skim milk being fed to calves and pigs and the cream sold to a large creamery company. This company has men located in the different localities who go out through the country and gather the cream which they deliver to the large central factory. These gatherers make four trips per week, taking the weight of the cream and a composite sample each trip. The samples are tested at the end of the week and a report of the weights test and price returned to the patrons.

This change, however, has not seriously injured the trade of the cheese factories, which are firmly supported by their German and Swiss constituents. But the creameries have suffered quite a loss of patronage. One has already changed owners and has quit churning butter and gone into the condensing business. Others are still running, but are slowly but surely losing ground.

STICK TO THE COUNTRY.

Our advice is that unless a salary of \$1800 per year is in sight, stick to your job in the country. One thousand dollars per year or even eight hundred in the country means more to you there than will \$1800 in the city. Besides, there is more real downright comfort and happiness in the country for the man and his family, who has to work for his living than the city can afford.—Chicago Dairy Produce.

Experiment Station Notes.

C. E. SNYDER.

Among the late publications of the Ohio Experiment Station we wish to call particular attention to Circular No. 71, The Selection of Seed Corn, published by Mr. C. G. Williams.

This circular shows work which is so practical and results which are so decidedly good and so easy to obtain that the ordinary farmer will quickly see the advantages to be obtained by a little care and forethought in the selection of his seed corn. It is something so tangible that it will appeal to any farmer into whose hands it may fall and we cannot predict but that great good will come from it.

Mr. Williams sums up his results as follows:

Seed corn should be selected in the fall and before the crop is harvested in order that the best seed may be secured and properly cared for.

Seed selected where the stand and other environment was normal, has given an average yield of 3.23 bushels per acre in excess of seed selected in the ordinary way.

Heavy-weight seed ears have exceeded medium-weight ears in yield 5.9 bushels per acre.

Medium long ears have exceeded medium short ears in yield 4.85 bushels per acre.

Vigor of plant as shown by ability to stand upright is hereditary. Ear rows growing side by side have shown a variation of from no broken plants to 56 per cent. of broken plants.

Bulletin 182, Ohio Agricultural Experiment Station, Field Experiments With Fertilizers on Cereal Crops and Potatoes, by Director Thomas, is a sum-

mary of work done in 3 years, 1894-906, inclusive.

This bulletin gives the results of soil fertility experiments after 13 years' work. This work is still being carried on so that new results are being continually obtained, but those already obtained give some very valuable information. The tests have been made with many different kinds of fertilizers and with different rotations of crops. The conclusion drawn at this stage of the work is that the points of chief importance in deciding the fertilizer requirements of a good crop are:

1. The geological history of the soil upon which the crop is to be grown.
2. The system of cropping which is being followed and the place in that system of that particular crop.
3. The botanical relations of the crop itself. That is, whether it is classed with leguminous or non-leguminous plants.

Some News Notes.**THE NATIONAL CORN EXPOSITION.**

The first National Corn Exposition, which was held at Chicago October 5 to 14, was a grand success, and undoubtedly the most attractive show of its kind ever put on anywhere. Corn from twenty-five states was on exhibition, coming from as far east as Massachusetts and as far west as Colorado. There were 10,000 samples shown, which was about all any one would care to look over. The surprise of the show was the excellent display of corn from the Northwest, and this tended to indicate the fact that the corn belt is being rapidly pushed farther north into the Dakotas, Minnesota and Wisconsin. This exposition was made possible by the generosity of Chicago business men, who subscribed to a guarantee fund of \$75,000. The idea of the exposition was

educational, the display showing the visitor the great importance of the corn crop, and, how to produce high grade and a high yield. Over 60,000 people attended the exposition.,

Mr. O. E. Bradfute, of Cedarville, who is well known as a breeder of Angus cattle, and who is one of the trustees of O. S. U., received the first prize \$50, for the best 12 ears of yellow corn raised in Ohio.

NATIONAL DAIRY SHOW.

The National Dairy Show opened Friday, October 11, at Chicago. About 600 dairy cattle, representing six breeds, and a very comprehensive exhibit of dairy utensils filled all available space. It was pronounced the most extensive and representative dairy exhibit ever held in this country. The attendance was exceptionally good all through the show.

A NEW THOUGHT IN AGRICULTURAL ECONOMY.

The exhaustion of our soils, and methods to prevent exhaustion has been and always will be a subject for much study and research. Every crop takes a certain quantity of nitrogen, potassium and phosphoric acid from the soil, and if this is continued without replacing anything or making more available, it is only a question of time until our soils will become barren. A large proportion of the substance of plants consists of carbon hydrogen and oxygen, and these elements exist in unlimited quantities in the air and water. However, certain amounts of nitrogen, phosphorus and other exhaustible elements must be present to enable the plant to assimilate the carbon, oxygen and hydrogen, and the point in question is to grow plants which can produce the most of starches, sugars and fats with the smallest use of

the soil fertility, or in other words, which plants can make the most starch, sugar and fats with the least drain on fertility. It is obvious that if we can select such plants or breed plants having this quality we can produce more food without adding to the drain on fertility. Professor Strekosh has recently called attention to this fact and gives figures to show the different assimilating power of plants. Putting this so-called assimilating power of rye at 100, that of barley is 130, corn 200, beans 350, oats 95. In the grasses and clovers, timothy is 68, red clover is 403 and crimson clover 616. While at the present time this idea is not likely to excite much attention the time may come when the question of a sufficient food supply may compel attention to even smaller economic savings than this.

ROADS OF BURNT CLAY.

In many localities the absence of gravel or even stone for crushing, makes the good road problem a difficult one to solve. Many plans for making roads have been tried in the absence of these articles, but usually the road turns out to be a mud road after all. Down in Mississippi experiments are being made with burnt clay roads, and according to reports fair roads can be made of this material. The first test of clay for roads was made at St. Louis during the exposition. The clay was burned and hauled on the road and while a good road was produced it was too expensive to be practical. In Mississippi they are burn the clay right on the road and obviating the hauling. The road is graded, plowed very deeply and furrowed crosswise. Cordwood is piled lengthwise to form flues. Two or three layers of smaller wood are piled above with layers of clay between the pieces of wood, and the chunks of clay diminishing in size to-

ward the top and being placed just close enough to allow air currents through the whole pile. Six inches of burnt clay was made in this manner after leveling and rolling. This road is said to be free from dust and not to hold water.

DESTROYING SCALE INSECTS BY DISEASE.

While the idea of destroying insects by disease is by no means new, success in the undertaking is new. Therefore the report of Professor R. H. Rolfs, of Florida, of success in combatting the San José scale and other scale insects on citrus fruits, is very interesting. He makes pure cultures of the fungi and these are diluted and sprayed on the trees or spread by hanging branches with diseased insects on the trees. He claims he did wonders in an extremely dry season, although in the past a wet season was thought to be necessary if any results were to be obtained from the use of fungous diseases. Perhaps Professor Rolfs is too enthusiastic, but nevertheless his future success will be closely watched.

The State of Florida is trying to estimate the cost of draining the Everglades. Engineers have been making surveys, and claim the project is feasible.

The French government during the last seven years has bought 221 coach stallions, at a cost of over \$500,000, nearly \$100,000 annually. Although extra high prices are paid for some animals, like Beaumonois, for whom \$14,000 was paid, the average price ranges from \$2000 to \$4000.

Around the University.

"HEINIE" VAUGHAN, SENIOR CLASS PRESIDENT.

Students of the Agricultural College are happy over the recent class election at the University, for the most coveted office, that of Senior President, was secured by Henry W. Vaughan, a student in the Agricultural College. The agricultural students have felt for some years that they were entitled to have this office filled by a man from their college, and when Mr. Vaughan decided to become a candidate they all worked hard for his election. Mr. Vaughan proved himself a good politician and a popular fellow, for he was elected by a majority of nearly 150 votes over his opponent. Mr. Vaughan is a member of the Student Council and has worked hard in the efforts to make the work of this organization mean something.

The election this year was carried on in the most approved manner under the Australian ballot system. All voters were obliged to register the Friday preceding the election, a regular ballot was prepared, and in fact everything done according to regulation. Some of the other class officers elected were: Senior vice-president, Miss Ruth Davis; secretary, Miss Columbia Thompson; historian, Miss Margaret Wilcox; class orator, B. Frank Miller, of Urbana; ivy orator, C. S. Stephenson, of Pleasantville; pipe of peace orator, Frank J. Murray; prophet, Miss Ophelia Byers; poet, Miss Myrtle Rubie. In the Junior Class, C. E. Farbach, of Cincinnati, was elected president. Ed. Kinney, of Bellaire, was elected Makio editor. The Sophomore president is Charles T. Sherman, of Willoughby.

Considerable interest was manifested in the election of members to the Student Council. The following were elected:

Senior Class, Henry A. Cogwill, J. R. Burkley and Edgar M. Allen; Junior Class, Allen Bond, Roy H. McIlroy, Robert N. Waid; Sophomore, Donald Kirkpatrick, Felix W. Hoffman, Harry Howard and Thomas E. Lake. The old members held over are: H. W. Vaughn, W. M. Matthews, H. P. Pruner, H. A. Carr and A. B. Cohn.

WHO WILL MAKE THE JUDGING TEAM?

The class in advanced judging this fall is one of the largest for years, numbering about twenty-five. As the team to be sent to Chicago to the International Stock Show is to be chosen from this class, the boys are making some strenuous efforts to place the animals right. It may safely be said that no class in our college does more good, hard, and practical work than this class, and there is none in which there is more interest taken in the work. Some of the boys are showing up in good form and when called upon to place a ring of animals, do it in good style and give their reasons in show ring language. Before the judging team is chosen, there promises to be some lively competition among the boys. It is quite an honor to be chosen on this team, and although all of the fellows make public statements to the effect that they have not the least idea of making the team, most of them have a secret feeling that they would look pretty good on it.

The class makes a trip to visit some of the Greene county herds this week, and will spend two days in that part of the country, where some of the best herds of pure-bred stock in the United States are to be found. It is possible that the work done on this trip will decide who will constitute the team for Chicago.

Professor Oscar Erf, the new head of the Dairy Department, was at the University a short time recently, and left for Chicago, where he attended the National Dairymen's convention, of which he is a director. He spends some time in Manhattan Kansas, and will be at O. S. U. about the 25th of December.



Dr. Hamilton, of the U. S. Department of Agriculture, farmers' institute specialist, was a visitor recently at the Agricultural College. He made a careful examination of the work being done in the Agricultural Extension Department, this being the special object of his visit.

Word from Professor I. H. Shaffner, of the Botany Department, states that he is in Interlaken, Switzerland, and will soon settle in Zurich for his year's work in that university.

Dr. Michael, of Brazil, visited the University week before last. Dr. Michael is an educator in Brazil, being especially interested in agricultural education.

AG. FOOTBALL TEAM.

The "Ags" have a football team, which is touted as a sure winner in the class and college games to be played at O. S. U. They are practicing faithfully and look like they would make a hard proposition to come against.

Organization News.

TOWNSHEND LITERARY SOCIETY.

Townshend Literary Society is in a most flourishing condition this year. More new members have been taken in and more interest evinced in the meetings than for some years. Following upon Professor Price's remark at the annual reception given by Townshend, to the effect that nothing in the constitution would prevent the Domestic Science girls from becoming members, this feature was later taken up and discussed by the society. It was decided that the society ask the ladies to join provided they wished. It seems that they did like the idea, for many signified their intention of joining. Thus one-time honored feature of this society has been changed, and Townshend Society hall will now resound with the chatter of the co-eds on Friday nights.

 AGRICULTURAL SOCIETY.

The first meeting of the Agricultural Society was held Wednesday, October 9, in Townshend Society hall. While the attendance was not as large as it should have been, an exceedingly interesting and valuable evening was passed. Talks and papers, followed by discussions in each case, were given by members. These meetings offer for agricultural students the only opportunity of coming together and expressing their ideas upon agricultural subjects, and are open to all students of the Agricul-

tural College regardless as to whether they are members of the society or not. All students should aim to attend these meetings if they can possibly do so. If you have only time to attend the meetings of one organization, make this the meetings of the Agricultural Society.

Alumni News.

S. H. Shawhan, '07, recently received an appointment to a position in the U. S. Bureau of Animal Industry and is now located at Washington, D. C.

George Crabb, '07, who has held a position in the Bureau of Soils at Washington, D. C., has been elected an assistant in the Agronomy Department at Cornell University. He will work under the direction of Professor Tiffin.

R. C. E. Wallace, '06, was a visitor at the University the Saturday of the Wooster-O. S. U. football game.

C. F. Hyde, ex-'06, attended the Wooster-O. S. U. game and visited the University and old friends.

C. J. Koontz, '07, was a visitor at the college recently. He is farming near New Carlisle, Ohio.

George Hyslop, '07, assistant in the Agronomy Department, was called upon to judge the corn exhibit at the "pumpkin show" recently held at Circleville, Ohio. This affair is really a street fair and all kinds of produce is upon exhibition. Mr. Hyslop reports a good corn exhibit. He was presented with the 12 prize-winning ears, the variety being Boone County White. Mr. Hyslop also acted as stock judge at the Noble county fair held at Summerfield in that county.

William Palmer, '07, acted as one of the stock judges at the Lancaster fair.

C. White, '07, attended the Wooster-O. S. U. football game October 19, and looked up his friends.

THE AGRICULTURAL STUDENT.

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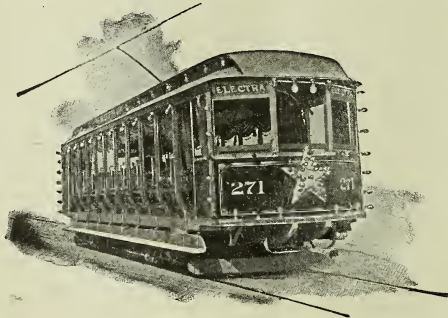
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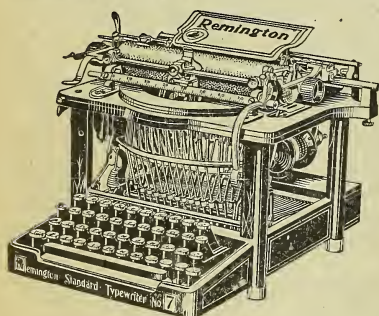
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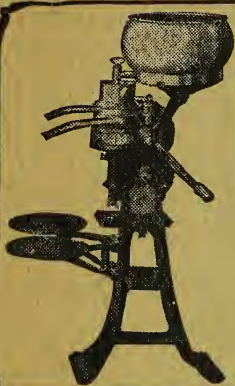
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